Vol. 69. No. 23. Issue No. 4151 575-594 JUNE 8th, 1957

OHIO STATE UNIVERSITY JUN 28 1957 LIBRARY
RECEIVED JUL - 1 VET. MED. LIBRARY

THE VETERINARY RECORD

The Journal of the British Veterinary Association

Patron: Her Majesty the Queen

Principal Contents

SYMPOSIUM: THE RELATIONSHIP BETWEEN ENVIRONMENT AND THE INCIDENCE OF DISEASE IN SHEEP

including

INTRODUCTION
J. T. Stamp

THE RELATIONSHIP OF ENVIRONMENT AND THE INCIDENCE OF PARASITIC DISEASE IN SHEEP
P. H. Silverman and J. A. Campbell

THE RELATIONSHIP OF ENVIRONMENT TO THE INCIDENCE OF METABOLIC DISEASES IN SHEEP
K. C. Sellers

SUMMARY
P. L. Shanks

A POSSIBLE IMMUNOLOGICAL RELATIONSHIP BETWEEN CANINE DISTEMPER AND RINDERPEST
J. B. Polding and R. M. Simpson

FULL DETAILS OF THE 1957 B.V.A. ANNUAL CONGRESS

CURRENT LITERATURE NEWS AND COMMENT

CORRESPONDENCE

Contents

Symposium :

The Relationship Between Environment and the Incidence of Disease in Sheep

Introduction 575
J. T. Stamp, D.SC., M.R.C.V.S., F.R.S.E.

The Relationship of Environment and the Incidence of Parasitic Disease in Sheep 577
P. H. Silverman, B.S., M.S., PH.D.
J. A. Campbell, PH.D., B.A., M.R.C.V.S.

The Relationship of Environment to the Incidence of Metabolic Diseases in Sheep 579
K. C. Sellers, PH.D., B.SC., M.R.C.V.S., D.V.S.M.

Summary 581
P. L. Shanks, B.SC., M.R.C.V.S.

General Article :

A Possible Immunological Relationship between Canine Distemper and Rinderpest 582
J. B. Polding, PH.D., B.SC., M.R.C.V.S.
R. M. Simpson, B.V.SC., M.R.C.V.S.

In Parliament 584

The Annual B.V.A. Congress, 1957 :

Social Programme 585
Programme of Papers 586
Details of Authors and Opening Speakers 588
Coach and Bus Transport Arrangements 589

Current Literature :

Book Reviews 590

News and Comment :

Bristol University Appointment 584
The Agricultural Research Council 589
Rocket Flights by Dogs... 589
The Nutrition Society 590
Congress Tickets and Papers 591
New President of the R.C.V.S. 591
The R.C.V.S. Council 591
The Royal Society of Health 591
Holiday Exchanges 591
Caught the One that Got Away ! 591
University News, Liverpool 591
The Colonial Veterinary Service 592
Tercentenary of William Harvey 592
Mr. James A. McKinnon 592
The Late Mr. Vincent Boyle, C.M.G., M.R.C.V.S. ... 592
Personal 592
Coming Events 592
Foot-and-Mouth Disease... 593
Addresses of Disease Infected Premises 593
The Hampshire Cattle Breeders' Society 594

Correspondence :

Slaughter-houses 594
D. J. Anthony, M.R.C.V.S., D.V.S.M.

I S C

"CANINOVAC"
BRAND OF
CANINE DISTEMPER VACCINE
Egg adapted "Behring"

The ideal prophylactic for Canine Distemper and Hard Pad. Easy to use—both freeze dried vaccine and solvent are packed in rubber capped vials.

Keeps for 12 months if refrigerated.

"FELIVAC"
BRAND OF
FELINE INFECTIOUS ENTERITIS VACCINE
"Graeub"

The ideal prophylactic for this virus disease. Issued in single dose rubber capped freeze dried vials.

Keeps for 12 months if refrigerated.

INTERNATIONAL SERUM CO. LTD.
The Paddocks, Frith Lane, Mill Hill, London, N.W.7
Telegrams : Interserum, Mill, London. *Telephone :* FINchley 5554

The
VETERINARY RECORD

Founded by William Hunting, F.R.C.V.S., in 1888

7, MANSFIELD STREET, PORTLAND PLACE, LONDON, W.1. MUSEUM 6541

No. 23 JUNE 8th, 1957 Vol. 69

Registered for Transmission as a Newspaper *Price 2s. post free*

SYMPOSIUM

The Relationship Between Environment and the Incidence of Disease in Sheep *

J. T. STAMP : P. H. SILVERMAN and
J. A. CAMPBELL : K. C. SELLERS :
P. L. SHANKS

Introduction

BY
J. T. STAMP
Moredun Institute, Gilmerton, Edinburgh

THE title of to-day's meeting is " The Relationship Between Environment and the Incidence of Disease in Sheep," and since the word " environment " can be defined as the influences acting upon the organism (in this case the sheep) from without, it obviously gives plenty of room for choice of subject.

To introduce such a symposium is not, however, very straightforward for owing to the scope of the subject it is not easy to know upon which facets to concentrate. The subject is probably best approached from the orthodox view as to the causes of disease which can possibly be classified as :—

(*a*) Nutritional deficiencies,
(*b*) Living agents,
(*c*) Upsets in metabolism,
(*d*) Poisonous substances,
(*e*) Genetic abnormalities,

and thereafter the influence of environment upon these various aetiological factors will be considered. Having got this far I realise that your Committee has obviously thought on similar lines in deciding the programme of speakers for Dr. Silverman will no doubt be speaking on the group of living agents known as " internal and external parasites," while Dr. Bullen will talk on the other half of the living agents, the micro-organisms although viruses have perhaps been rather ignored.

In the afternoon Dr. Sellers is to speak on the metabolic diseases and if he can divorce these from nutritional deficiency I will indeed be very surprised. This then only leaves two categories, the genetic abnormalities not unimportant in sheep but in which (unless one believes in Lysenko's theories) environment probably plays little part, and the poisonous substances where in many cases environment only too clearly is very important but this is not to be discussed to-day.

With this classification in mind perhaps a brief review of some of the sheep diseases would be useful, especially with reference to environmental factors.

Diseases Caused by Nutritional Deficiencies

First, the nutritional deficiencies : a number of diseases of sheep are caused by a deficiency of some nutritional factor, probably the best and most clear-cut example being cobalt pine disease. In this case the simple replacement of the trace element cobalt to the environment of the sheep acts as a complete preventive. Other deficiency diseases also occur in the sheep but the understanding of the associated environmental factors in these is not so clear. For example, cappie (or scappie), essentially a generalised osteoporosis, is very prevalent in the sheep on the hills of our Border country ; since the feeding of calcium and/or phosphorus does not prevent its occurrence the late Dr. James Stewart postulated that the disease might be due to a combined vitamin D and phosphorus deficiency, the deficiency of vitamin D being due not to a dietary deficiency but,

* Papers presented to a meeting of the Association of Veterinary Teachers and Research Workers at the Moredun Institute, Edinburgh, January 7th, 1957.

to the incapacity of the winter sun of this northern climate to create sufficient vitamin D in the skin of the sheep. Such a theory most certainly implicates environmental factors in the production of a sheep disease. Further investigation is obviously necessary and until more information is forthcoming it would seem impossible to rear young sheep in the Queen's Park in Edinburgh because they invariably take this disease! Again, swayback appears to be associated with a deficiency factor in the environment but once more the aetiological factors are far from clear. Although low blood copper and liver copper are undoubtedly part of the syndrome and it is known that the dosing of pregnant sheep with copper prevents the disease, the copper content of the grazed pasture is often normal. Indeed, in my experience over-liming of pasture seems to be the major factor in most of the outbreaks I have seen but the relationship of this with copper metabolism is as yet unexplained.

The incidence of infertility, early foetal mortality, pregnancy toxaemia and the birth of non-viable lambs is considerable in hill sheep and probably causes serious economic loss to the hill farmer in many areas of Scotland. These conditions are not caused by any specific agents but result from keeping pregnant sheep under unsuitable environmental conditions during the winter months, conditions in fact of near starvation. Methods of preventing these serious "disease" losses are therefore intimately associated with the hardiness of hill sheep and the provision of satisfactory winter keep, matters which interest not only the veterinarian but also the geneticist, nutritionist, grassland expert and practical breeder. Up to the present the hill sheep breeder and the hill farmer by their skill in husbandry, endeavour to keep losses as low as possible with very little help from the scientist.

Closely associated with the deficiency diseases are those important conditions which, for want of further information, we call "the metabolic diseases." The best example is probably milk fever (often called "lambing sickness"), a disease associated with low blood calcium and responding readily to calcium therapy. The cause of the low blood calcium is unknown but it is almost certainly associated with environmental factors. As yet, however, there is no known method of preventing the disease so that losses are often considerable in hill flocks where immediate therapy is frequently impossible. While this remains so, we can hardly be satisfied with our present knowledge. Magnesium tetany (hypomagnesaemia), a further metabolic disease is also of considerable importance as a source of loss in many sheep flocks. Again the aetiology is confused and whether it is truly a metabolic disease or one caused by dietary or other environmental factors is not yet known. There appears to be little doubt, however, that climatic factors often play an important part in the onset of the disease. In a similar way climatic factors play an important part in some types of pregnancy toxaemia.

Disease Produced by Living Agents

In discussing disease produced by living agents most emphasis is, quite rightly, placed on the damage the microbe or parasite does to the host but that there are other factors of importance is well understood. When a sheep, for instance, becomes infected by a disease-producing living agent one naturally wonders where the agent came from and how it managed to be where it is. Many bacteria and viruses are transferred by contact of healthy animals with infected ones either directly, by the sexual act, by unhygienic handling or by the ingestion of infected pasture or food as, for example, lamb dysentery, braxy, metritis, Johne, foot-rot and many others. However, some bacteria and viruses and many parasitic animals such as flukes and worms require an intermediate host for their transfer and since many of the intermediate hosts are directly controlled by environmental factors the diseases they transfer must also be indirectly controlled by similar factors. Liver fluke and its varying incidence from year to year according to the availability of infected snails is an excellent example while in a similar way the incidence of louping-ill varies with the availability of the tick. With most parasitic diseases the infecting organism has to undergo a free stage or cycle of one type or another between host infections, a cycle which must obviously be very dependent upon microclimatic conditions which in turn are dependent upon macroclimatic and other environmental states. Such associations are very evident in most of the stomach-, intestinal- and lung-worm infestations. Unfortunately, the relationship between parasite and environment is very complicated and varies from one worm to another, a fact made abundantly clear in recent years by the rediscovery of the unusual behaviour of the species Nematodirus.

Fortunately for the host, the mere transfer of disease-producing organisms to a new host does not necessarily lead to certain disease for most animals have good mechanisms for repelling an invader, the most important being those of acquired immunity. In the present symposium, however, consideration of natural resistance against disease is probably of greater interest because variation in this factor does appear to be dependent to some extent upon environmental factors. There is of course little difficulty in such virulent infections as lamb dysentery, anthrax and foot-and-mouth disease where it would seem that the mere presence of the organism is sufficient to cause the disease, but in many other conditions consideration must be given to predisposing causes as well as the pathogen which may in a number of instances be ubiquitous in healthy sheep. Braxy, for instance, seems to occur only under certain very well-defined environmental conditions (the story of frosted food as the aetiological factor has still not been bettered), while pulpy kidney and enterotoxaemia also occur under certain definite circumstances as also does *Pasteurella haemolytica* infection. There is convincing evidence that strong, well-grown animals are more susceptible to blackleg, louping-ill and black disease. It is, however, accepted but by no means proven that well-fed animals are more resistant to such diseases as parasitic gastro-enteritis and tuberculosis. There is evidence, too, that some diseases such as scrapie and Johne's disease only manifest themselves on some farms and not on others.

Lastly, certain pastures which are good by all recognised standards are known on occasion to have strange effects (yellowses, profound haemolytic anaemia, goitre and heavy milk production in virgin sheep) upon the animals eating them. One could therefore well suppose

that there may be other unknown factors in apparently normal pasture which might upset the host-parasite relationship. Admittedly, these are only vague assertions but they seem to be familiar observations amongst those experienced in sheep husbandry and indeed such ideas have been widely discussed and written about at agricultural meetings and in the agricultural Press.

Conclusion

In conclusion, may I put forward one or two opinions. In the first place, in any discussion of this kind I think it is wrong to lose sight of the fact that the prevention of the majority of sheep diseases is dependent upon either total eradication of the parasite or control of the parasite by vaccines, sera or drugs (and in these fields Moredun Institute has played a major part). Secondly, that despite the probable rightness of such ideas as I have surveyed it must be realised that both the scientist and the practical stocksman are all but ignorant of the nature of the association between environment and disease. Although it does seem possible that some of the diseases which are as yet uncontrolled, or only partly controlled, may some day be checked by man-made changes in the host's environment, we as yet have scanty knowledge of the essential facts. I think practical advances in this field will not be readily made but we are to-day all looking forward to hearing some of the relevant facts which must be forthcoming from biological research before we can hope to give practical advice to stockowners.

The Relationship of Environment and the Incidence of Parasitic Disease in Sheep

BY

P. H. SILVERMAN and J. A. CAMPBELL

Moredun Institute, Gilmerton, Edinburgh

THE life histories of parasites are so diverse that it is very difficult to attempt to draw general conclusions about factors which influence the rise and fall of parasite populations. The epidemiology of protozoal parasitic diseases (*e.g.*, coccidiosis) differs considerably from that of ectoparasitic anthropods (ticks, flies and lice) and from that of intestinal worms (*i.e.*, tapeworms and nematodes). For these reasons we propose to restrict our discussion to a consideration of some environmental factors which operate in the epidemiology of nematode gastro-intestinal helminthiasis.

Parasitic disease contains a concept of imbalance between the host and its parasites. When sheep are closely stocked there is a tendency to a more rapid increase of the worm population than when they are lightly stocked, and consequently more chance of the resistance of the host to infestation becoming overwhelmed. Perhaps it is this phenomenon more than any other which leads to the attitude that agricultural improvement, since it involves closer crowding of animals, is the main cause of parasitic disease or "imbalance."

Of course a farmer produces a greater risk of losses among his stock when he concentrates animals, but parasitic disease is not an inevitable result. The conditions of sheep concentrated on a field are not unnatural; left to their own devices on hills they concentrate themselves regularly and suffer helminthiasis. Even among non-domesticated animals parasitic disease can occur, *e.g.*, red deer and red grouse suffer outbreaks from infestations of trichostrongylid worms. It is wrong to postulate a balanced ideal in which the parasite's presence does not on occasion take toll of individuals. This, of course, does not help the sheep farmer but it does suggest that his practices are not necessarily culpable and are less unnatural than some would have us believe.

Life-cycle of a Nematode Parasite

Hill pastures and ley grassland represent the environmental extremes under which British sheep are kept; their parasitological problems differ, we believe, in degree rather than in kind. We propose to consider a simplified model of the life-cycle of a nematode parasite in relation to the succession of environmental factors which it encounters. This cycle can be arbitrarily divided into four phases (A, B, C and D) which are conveniently discussed separately. While dealing separately with the phases as they affect individual parasites, it must be emphasised that from the aspect of parasite population dynamics the events of each phase are closely related to those of all the other phases; *i.e.*, the processes are continuous.

A. Host-parasite Relationship

It is convenient to begin discussion with the sheep, whose gut is the new environment for the ingested third stage larvae. The infective larvae exsheath and enter the mucosa, moult to fourth stage larvae and either remain in the mucosa in a suspended state of development or emerge into the gut lumen as young adults. The environment of the fourth stage larvae is, therefore, the host tissue, and here it may be subjected to immune responses or allergic reactions of the host. It may also be influenced by the hormones of the host and this factor will undergo annual variation with reproductive cycle, diet, etc. Fourth stage larvae appear to be able to over-winter in the host mucosa.

The phenomenon of "spring rise" in the egg count in sheep is very probably due to an increase in the adult worm population in the gut and it has been suggested that this increase is derived from larvae ingested shortly before the spring rise occurs (Morgan *et al.*, 1951).

The spring rise, however, occurs at times unrelated to pasture infestation, and can occur in animals kept under experimental conditions indoors. The increase in the adult worm population at this time is, therefore, most likely to result from the emergence into the lumen of larvae which have over-wintered in the host mucosa. Parnell, Dunn & Mackintosh (1954) in Scotland, and Crofton (1954a) in England, have shown that the "spring rise" is correlated with parturition and probably results from lower resistance due to nutritional deficiency, although it also occurs in non-lactating animals.

The emergence of fourth stage larvae from the mucosa is affected by the size and age of existing infestations. How this mechanism works is unclear, but the influence of the existing adult worm population apparently helps to govern the rate of emergence.

The adult worm lives under fairly stable conditions since it remains in the mucus overlying the mucosa which protects it from drastic changes taking place in the gut lumen. Nevertheless, from *in vitro* studies by Davey (1938), we learn that adult worms are capable of tolerating wide variations in *p*H. The characteristic distribution of the various helminth species throughout the alimentary tract is related to preferences for bile salts, enzymes, oxygen tension and nutritional requirements.

The method by which non-bloodsucking gut helminths obtain their food is not clearly understood. Recent work with radioactive tracers has shown that tapeworms obtain nutrients from direct contact with the mucosa which absorbs and digests raw material from the lumen and allows a certain amount to pass out again (Chandler, Read & Nicholas, 1950).

The outside conditions which may affect the host-parasite relationship are mainly nutrition and weather. The effects of adverse weather or nutrition on host resistance are of two types which must be distinguished ; (1) lowered resistance to establishment of an infestation and (2) lowered resistance to the effects of an infestation. For example, a healthy animal subjected to severe winter conditions may come down with scouring due to a diminished resistance to the effects of an otherwise tolerable worm burden, but may be resistant to a reinfestation in the spring.

One last remark regarding the host phase is that we still do not know the longevity of fourth stage larvae, the longevity of adult worms, the duration of egg laying and the effect of existing infestation on incoming populations.

B. Transfer of Eggs from Host to Pasture

The rate of transfer of eggs from host to the pasture is dependent on the sum total of the activities in A.

The helminth egg may be the only stage in the host which, as it passes down the gut, is exposed to the varying *p*H, temperature and enzyme conditions which exist in the lumen, although there is some evidence that eggs are passed into the mucus layer and remain within a mucus protection until they enter the colon.

The time of exposure of the egg to the high temperature of the gut depends upon the rate of passage of food. This may vary from a few hours for eggs which are passed in the lower gut to as much as five days for eggs passed in the abomasum. Castle (1956) has recently shown that individual variations in the time of food passage occur and these may differ with the age of the animal and the nature of its food.

The rate of development of the egg during its passage through the gut may vary although the extent of development appears to be limited by oxygen tension. Even though this limit be reached, however, the future development of eggs after eight hours' retention in the gut might differ from that of eggs retained in the gut for some 72 hours (at 40° C.).

The character of the pellet, whether moist or dry, will have a bearing on the ability of the eggs to hatch and develop. Factors which affect the character of the pellet include anything that can cause an intestinal upset, *e.g.*, helminthiasis or other disease condition, or a high-protein low-fibre diet early in the year. Michel & Rose (1954) have shown that moist faeces from lungworm-infected bovines are more important than dry ones in the dissemination and survival of *Dictyocaulus* larvae.

The distribution of faeces on pasture is not random. Crofton (1954b) has shown it to be discontinuous, consisting of aggregates which are, as might be expected, related to grazing behaviour.

It has been shown that hill sheep congregate to a much greater extent during spring months (April, May, June), when vegetation in certain associations is actively growing. They crowd on the areas dominated by the early growths of *Agrostis* spp., *Festuca* spp., *Juncus articulatus* associations, and on grasses which occur in the bracken-dominated areas (Hunter, 1954). Campbell (1952) has found that the distribution of sheep ticks follows this pattern of host congregation. Sheep are selective grazers and these factors have much greater play on the hill than on the low ground. This type of grazing behaviour greatly increases the degree of pasture contamination on certain patches and the consequent danger of infection to lambs which may be attracted to them.

All these factors greatly complicate the job of sampling pastures to determine the level of helminth contamination.

C. "Free-living" Stage of the Parasite

Once the pellets have been passed on to pasture they enter the "free-living" or outside-the-host stage and become subject to the vicissitudes of the micro- and macro-climate.

(1) Pellets may be dried up by warm dry weather—in which case there is little chance for survival of worm eggs and larvae (Taylor, 1938).

(2) Pellets may be broken up through saturation by moisture and then spread by the grazing animals.

(3) Pellets may be broken up and their contents distributed by insects and earthworms.

The fate of the egg in the pellet is directly related to climatic and biotic conditions. Moist conditions above 50° F. are considered suitable for the hatching, development and vertical migration of infective larvae.

Environmental effects on vertical movements of larvae seem to suggest a diurnal rhythm related to daily temperature and moisture changes. Larvae migrate to the tips of grass in the morning and then appear to seek conditions lower down in the grass in the evening. This type of behaviour obviously affects the availability of infective larvae at different times of grazing ; much more work, however, requires to be done for a fuller understanding of the phenomenon and its mechanism.

A delay in the developmental cycle of *Nematodirus battus* apparently unrelated to physical conditions (temperature, etc.) occurs when the larva is retained within the egg shell. It is in this stage that the worm over-winters outside the host. The conditions which govern hatching and emergence of larvae of this species are not yet clear, although several types of shock (*i.e.*,

sudden change of temperature or high light intensity) can provoke hatching. This state of affairs, which resembles diapause in insects, suggests the possibility of delayed development in the free-living stages of other strongyles, although by analogy with insects, it may affect smaller proportions of the population than in *N. battus*.

The longevity of third stage larvae and the duration of their infectivity is incompletely known. It is difficult to obtain precise measure of these periods. The limitations of pasture sampling techniques hamper observations under natural conditions and it is difficult to assess the relation to natural conditions of observations made in the laboratory. When host animals are used to "sample" contaminated pastures, the unknown factor of the host's resistance complicates the interpretation of results.

D. Intake of Infective Larvae by Sheep

The intake of infective larvae by sheep depends upon their grazing behaviour and the way in which it is modified by husbandry practices. Because of the discontinuous distribution of larvae on pasture, the selective grazing habit of the sheep (including the avoidance of areas contaminated with fresh faeces (Crofton, 1954b)) plays an important part in the rate of intake. The often quoted example of the possible antagonistic effects of sward length may be mentioned here. Long grass appears to favour larval survival but might reduce the chances of an individual larva becoming ingested.

Of the four parts of the parasite life-cycle, the events in this fourth phase are the most difficult to measure.

Conclusion

Observations which are dependent on data from whole flocks with mixed infestations tend to obscure the dynamics of the host-helminth complex. Daily fluctuations in egg output, fluctuations in the populations of the various species in mixed infestations need to be disentangled before they can be related to environmental factors. We at Moredun hope to isolate and study some of these factors by attempting to maintain sheep individually and in groups on enclosed pastures with infestations of single worm-species.

References

CAMPBELL, J. A. (1952). *Rep. 14th Intl. Vet. Cong. London* : 1949. **2.** 113.

CASTLE, E. J. (1956). *Brit. J. Nutrit.* **10.** 338.

CHANDLER, A. C., READ, C. P., & NICHOLAS, H. O. (1950). *J. Parasitol.* **36.** 523.

CROFTON, H. D. (1954a). *Parasitology.* **44.** 465.

———. (1954b). *Ibid.* **44.** 313.

DAVEY, D. G. (1938). *Ibid.* **30.** 278.

HUNTER, R. F. (1954). *J. Brit. Grassland Soc.* **9.** 195.

MICHEL, J. F., & ROSE, J. H. (1954). *J. Comp. Path. therap.* **64.** 195.

MORGAN, D. O., PARNELL, I. W., & RAYSKI, C. (1951). *J. Helminth.* **25.** 177.

PARNELL, I. W., DUNN, A. M., & MACKINTOSH, G. M. (1954). *Brit. Vet. J.* **110.** 185.

TAYLOR, E. L. (1938). *Vet. Rec.* **50.** 1,265.

The Relationship of Environment to the Incidence of Metabolic Diseases in Sheep

BY

K. C. SELLERS

Farm Livestock Research Station, Stock, Essex

THE subject of this symposium is extremely fascinating, but it suffers from the grave disadvantage that our knowledge is dependent very largely on subjective opinion rather than on critical experiment or trial. This disadvantage applies more especially to metabolic diseases of sheep which, to my mind, are not at all clear-cut or well defined and are frequently diagnosed on insufficient clinical and laboratory evidence. The same criticism applies to a lesser extent to diseases associated with infection or parasitism, but in these, subjective opinions can be qualified by precise data such as total worm counts, demonstration of bacteria and toxins, or by serological tests. Again, field investigations of metabolic diseases are more often than not limited to isolated outbreaks ; in other words, they are particular rather than general, and the "environmental" information and the conclusions reached may apply to that one outbreak only. Even planned investigations, where an all-out effort to study a condition such as pregnancy toxaemia under field conditions is attempted, have been limited in scope because of factors such as time, number of personnel available, distance and laboratory facilities. Nevertheless, such investigations, coupled with laboratory experimentation, have gathered together a great deal of information which forms a valuable basis when studying environmental factors.

The association of various deficiency conditions such as swayback with environmental factors has already been mentioned by our opener. It is not my intention to deal with this type of disease but with the "acute" metabolic disorders such as pregnancy toxaemia, hypocalcaemia and hypomagnesaemia.

Pregnancy Toxaemia

A study of published work on this syndrome indicates that external factors such as nutrition play a much more decisive role in its occurrence than internal factors ; by "internal factors," disease of the ewe, the foetus, or the placenta is implied. The healthy growing foetus, however, may play a part in the causation of the disease under field conditions for, in the period of pregnancy when pregnancy toxaemia occurs, the foetal needs become significant in relation to the normal maintenance demands of the ewe (Barcroft, 1945). In the field, the picture is not so clear but the precipitating factors fall into three broad groups ; a progressive shortage or low intake of food throughout pregnancy, a complete deprivation of food during late pregnancy and a sudden onset of the disease in ewes in good or fat condition where adequate food is available (Pugh, 1954).

Hypocalcaemia and Hypomagnesaemia

Hypocalcaemia and hypomagnesaemia may occur singly, together or sometimes complicating "pregnancy

toxaemia." Rowlands, quoted by Heath (1955), found that metabolic diseases, presumably of this type, accounted for 102 deaths of 374 adult sheep examined *post mortem* in one year. What part environmental factors played in this incidence is not reported but it can be inferred that the majority of specimens were from Hill and Hill Cross flocks maintained in North Wales or Anglesey. In a brief search of the literature I have been unable to find any definite references to these conditions as they occur in relation to environment.

In 1952–3 and 1953–5 surveys of losses in pregnant and parturient ewes were made in Yorkshire. The results of the first or preliminary survey have been published (Sellers & Leech, 1955) and the analysis of the results of the second survey has just been completed. Very briefly, the number of losses in ewes in about 240 flocks scattered throughout Yorkshire containing a total of approximately 40,000 ewes was obtained by questionnaire. In the case of losses of ewes during pregnancy our data referred to deaths only, and there was no question of naming or diagnosing the conditions which may have caused these deaths. In the second survey losses were divided into those occurring during the first, second and last third of pregnancy and those due to accident. In addition to assessing losses, questions were asked regarding various environmental factors such as altitude, method of husbandry, feeding practices and other factors which might be concerned with environment, such as breed differences and twinning rate. The large amount of data collected has brought to light a number of associations from which certain deductions can be made, but in discussing these associations it must be stressed that these two surveys were designed as preliminaries to further work ; they demonstrated the existence and relative distribution of the losses and the factors with which they were closely associated. These various associations and relationships may, in fact, exist but their validity can be established only by more detailed investigation and experiment.

1. *District Effects*

It was found desirable to classify our data on the basis of geological formation—in other words on a broad environmental basis rather than by breed, size of farm or some other method. The fact that breeds, farming methods and so on were similar in each geological area indicates the profound effect district has on agricultural practice and in turn on the produce of the farm as represented by crops or by stock. A similar effect was observed in disease incidence in the ewes in relation to district (Table I).

TABLE I

LOSSES IN RELATION TO DISTRICT

	Losses during pregnancy	Losses at parturition
Arable Farming	1·4	2·0
Mixed farming	4·2	2·4
Grassland farming	2·7	1·7
Hill farming (Northern Dales)	0·9	0·6
Hill farming (N.E. Moors) ...	4·4	0·9

Losses expressed as per cent. ewes.

These figures are derived from our first survey, but our second survey showed that about 60 per cent. of deaths occurred during the last third of pregnancy. All breeds are included in this table but losses in individual breeds varied from district to district ; losses during pregnancy were higher in Down breeds and crosses than in Longwool breeds and crosses in the arable districts of the East Riding, whereas the reverse occurred in the mixed farming areas in the same county. Environment, as represented by district, may also have a marked effect on the occurrence of multiple births. Under hill conditions, 9·8 per cent. of hill ewes gave birth to more than one lamb—on the grasslands the same breeds had a 20 to 30 per cent. twinning rate. The effect was even more marked in the case of the Masham (Longwool × Hill) cross ; 6·7 per cent. on the hill and 78·4 per cent. on the grasslands. If pregnancy toxaemia is more likely to occur, as is claimed, in ewes carrying two or more lambs, then district might be expected to have a marked effect on its incidence. This attractive association, however, did not hold up to further investigation and we were unable to show that an increased mortality in the last third of pregnancy was related to an increase of multiple births. This may represent an omission in our surveys for we had no means of deciding the cause or causes of death in this period. In the second survey " flushing " effects were also studied and appeared to cause no increase in multiple births but flushing in the autumn, 1953, may well have been redundant since the food supply was particularly good.

2. *Feeding Effects*

It was noted that many flocks in the Holderness area of the East Riding (mixed farming) received no hay during pregnancy, and that pregnancy deaths in this district reached a higher level than in other districts with the exception of the North Eastern Moors. Analysis of results from all regions suggested that hay might, in general, be a potent factor in preventing deaths. In our second survey we took care to follow this lead with especial reference to deaths in the last third of pregnancy. Our figures indicated that in this period hay reduced deaths in Yorkshire flocks with or without supplements, but a similar effect was not found in a small sample of Lancashire flocks included for comparative purposes. The results also seemed to indicate that concentrate supplements tended to increase deaths in the same period. It would be unwise to accept these findings without further investigation for it must be pointed out that precise details of the various foodstuffs fed during pregnancy, more especially the latter third, were not obtained. It is quite possible that even although concentrates were fed, they were insufficient in quantity or quality to supply the demands of the ewe during this critical period. Also these results represent the whole area surveyed and need breaking down into districts for further consideration. This has already been done for arable flocks—if these had access to grass during pregnancy there was a reduction in mortality ; if concentrates with or without hay were fed, the mortality increased in comparison with hay alone.

3. *Altitude*

It is my impression that altitude in itself has little direct effect on metabolic disorders. The breed distribution, husbandry methods and herbage are affected

directly and may be much more important. In any case, altitude is relative and in most hill areas in Yorkshire sheep are not confined and will find shelter at lower levels in adverse weather conditions. Weather is coupled with altitude and the relatively higher losses in the North Eastern Moors could be associated with their exposed nature. Altitude may also have a direct effect on herbage and it would be interesting to assess the different effects of heather, heather and grass, and grass alone on the incidence of these diseases. Severe weather such as frost or snow, if resulting in a lack of available or sufficient food, may precipitate metabolic diseases. We know very little about the reaction of the pregnant ewe to variations in temperature or to humidity and results having a general application would be extremely difficult to obtain under field conditions.

4. *Shepherding, Farming Methods and Economics*

In considering environment these three factors must be borne in mind. The quality of shepherding obviously varied from district to district, and the low level of deaths in the Northern Dales probably reflected, among other factors, the keenness of the sheep owners in the area ; hypocalcaemia, by all accounts, was very common at one time in this area but with close shepherding and the popular use of modern therapy, it is seldom seen by the veterinarian to-day. Also, in these " low loss " areas, sheep farming is almost invariably one of the major farming efforts and the flock consequently gets priority in time of need. The losses in the East Riding arable and mixed farming areas may be related to the fact that sheep, except in the case of pedigree flocks, are a secondary farm product and, although shepherding may be good, losses—unless reaching high levels—have very little economic effect and thus do not receive the attention they should warrant. In these areas, also, the ewe flocks may receive a superabundance of food after harvest, go to the tups in good or even fat condition, while the level of nutrition is not or cannot be maintained during pregnancy.

No mention has been made of exercise, and no details of this factor were obtained in the surveys but the effect of exercise under different methods of feeding and management would be extremely interesting to assess.

Conclusions

I have dealt with some environmental factors ; others, such as exercise, type and quality of herbage and its effects on rumen digestion, sudden deprivation or change in food, have not been touched on. It is wrong to consider each factor as a separate entity for in its effect on the sheep it may not act singly and it seems unlikely that the relative importance or the significance of any one factor can be judged merely from surveys or investigations. I doubt whether the time is ripe for designing a really decisive experiment or series of experiments involving these environmental factors, for our existing knowledge of the aetiology and precise methods of diagnosis of these metabolic disorders is somewhat fragmentary. The most profitable approach would appear to be experimental physiological trials on the pregnant ewe in a closely controlled environment.

The surveys I have mentioned were designed as preliminaries to further investigations and experimental work and not to solve any one problem ; at present we are planning a more detailed survey in a local area in Yorkshire to explore some of the points which have been raised and to give more precise information. However, whatever any of us do in the study of environment we must avoid becoming armchair philosophers on the subject and try to base our opinions and theories on proved fact rather than on plausible but possibly erroneous associations.

References

BARCROFT, J. (1945). *J. Physiol.* **104.** 32P.
HEATH, G. B. S. (1955). *Vet. Rec.* **67.** 980.
PUGH, P. S. (1954). *Ibid.* **66.** 645.
SELLERS, K. C., & LEECH, F. B. (1955). *J. Agric. Sci.* **46.** 91.

Summary

BY

P. L. SHANKS

North of Scotland College of Agriculture, Bucksburn

IT would be impossible for me even to attempt a complete summary of the papers and discussions we have had to-day. What I propose to do instead is to pick out the salient points and I hope you will agree with my selection.

Dr. Stamp, in his Introduction, pointed out that the title of the Symposium, " The relationship between environment and the incidence of disease in sheep," covered the whole range of diseases in sheep except possibly inherited conditions and poisons ; that there was no doubt that disease in sheep was related to environment but that until the exact relationship was known, prevention of disease would have to continue to depend on vaccines, sera, etc.

Dr. Silverman followed with a paper on parasitic conditions. Dr. Silverman is to be very highly commended for his paper produced at very short notice because of the illness of the nominated speaker, Dr. Campbell. The main point arising from the paper and the discussion was " the spring rise " in egg laying. Much discussion centred round this phenomenon, and Professor White summed up the discussion very concisely by suggesting that the term is a misnomer since it has been shown that not only lambing but anything that lowers the resistance of the host's body will encourage egg-laying by the parasites and lead to a rise in egg counts.

On bacterial diseases, Dr. Bullen very wisely chose to speak on only one of the many bacterial diseases that occur in sheep and his subject was pulpy kidney disease. During the course of his talk he described his experimental work which confirmed a number of observations made by those dealing with field outbreaks. Any one of five factors could be responsible for an attack, (1) sudden change of diet, (2) excess food, (3) individual tendency to over-eating, (4) absence of epsilon antibody, (5) carrier state.

The last group of diseases to be discussed were those associated with metabolism. Dr. Sellars, who ably introduced this formidable subject, dealt with information collected during his survey of sheep losses under

(*Concluded at foot of col.* 1 *overleaf*)

A Possible Immunological Relationship Between Canine Distemper and Rinderpest

BY

J. B. POLDING and R. M. SIMPSON

Faculty of Veterinary Science, Makerere College, Kabete, Kenya

Introduction

THE small-animal clinic of the Faculty of Veterinary Science of Makerere College is fortunate in being sited on a large estate belonging to the Department of Veterinary Services, situated at Kabete on the north-western fringe of Nairobi. This estate, which is wholly devoted to veterinary concerns, is occupied by the Department's research laboratories and animal accommodation, including rabies quarantine kennels, other departmental buildings, and numerous staff houses. Up to a short while ago, the laboratories produced routinely a goat-attenuated rinderpest vaccine entailing the slaughter of numerous goats at the height of their reaction to rinderpest. After the wanted tissues had been harvested, the goats' carcases were fed to the majority of the estate's dogs, which probably numbered 70 or more. Before goat virus was produced, and indeed to a lesser extent since, meat from cattle artificially infected with wild virus was also routinely fed to dogs to prevent it being wasted. About two years ago one of us, whilst feeding the raw flesh of such carcases to his own Alsatians, concluded that the pharynx of virtually all dogs on the estate must have been exposed to goat and bovine virus at one time or another in their lifetime. He connected with this the peculiar fact that, whilst the small-animal clinic constantly encountered cases of distemper in dogs from the suburban area closely surrounding the veterinary estate, none had been noted in the dogs of the estate itself. The co-author, who has 17 years' experience of Kabete, and later other experienced members of the Department, confirmed that they had never at any time known a frank outbreak of distemper amongst the estate dogs. It appeared, therefore, that some relationship might exist between this curious enclave of apparent immunity to distemper and the feeding of rinderpest-infected meat; the following experiment was made to enquire into this possibility.

Experimental Procedure

A number of puppies was bred and reared on an isolated arable farm situated at Mau Narok about 100 miles from Kabete. On April 8th, 1956, four puppies aged between two and a half and three and a half months were brought to Kabete. They were subcutaneously injected on April 13th, April 24th, and May 5th, 1956, respectively, with 1.0 ml. of virulent rinderpest virus (Kabete O strain) derived from 2.0 g. of wet spleen harvested on April 10th, 1956, and suspended in 20.0 ml. of sterile, distilled water. These puppies, the principals, were numbered 5, 6, 7, and 8. On May 29th, 1956, four similar puppies (controls, Nos. 1, 2, 3, and 4) were brought from Mau Narok and were placed together with the principals in an isolated building. All puppies were injected subcutaneously with 1.0 ml. of distemper virus on May 30th (day zero). The injection consisted of reconstructed dried tissue virus, very kindly supplied by the Wellcome Research Laboratories, Beckenham (U.K.). It was received by air on May 19th, 1956, and cold-stored until used. At the time of injection a sample of unreconstructed virus was returned by air to the Wellcome Laboratories where it was tested and found fully potent. After injection the puppies were "temperatured" and examined night and morning. The reactions are recorded in Fig. 1 and a summary of the clinical responses in Fig. 2. On day 54 serum was taken from all dogs and, through the kindness of Mr. R. G. Scott of the Veterinary Laboratories, Kabete, titrated for rinderpest neutralising bodies against lapinised virus. The results of these titrations are shown in the last column of Fig. 2 (overleaf).

Results

Two principals (Nos. 6 and 7) responded with a small transient temperature rise about day 5 and with a second very slight rise about day 11; two others (Nos. 5 and 8) possibly showed lesser similar reactions. Otherwise all four animals remained clinically normal and thrived well for as long as they were observed. Two of the control puppies (Nos. 2 and 4) responded with high temperatures from about day

FIG. 1.—Morning and Evening Temperature Charts of Control Puppies Nos. 1 - 4 and Principals Nos. 5 - 8.

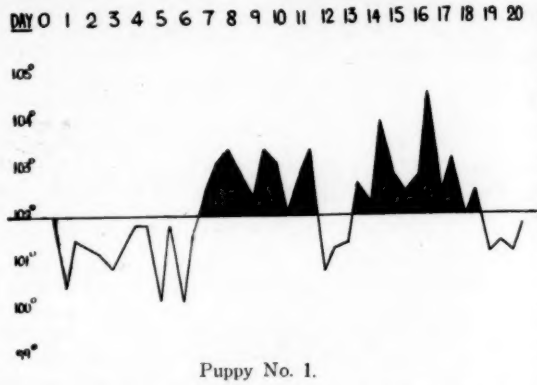
Day zero = day of injection with canine distemper virus on May 30th, 1956.

Symposium.—*Concluded.*

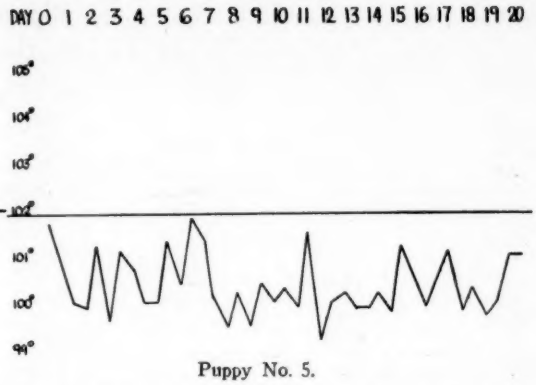
the various forms of management in Yorkshire. The discussion which followed brought out the difficulty experienced in making an accurate differential diagnosis between pregnancy disease, hypocalcaemia and hypomagnesaemia.

A more general discussion followed in which Pasteurella pneumonia, jaagziekte, and acute jaundice and other disease conditions were discussed.

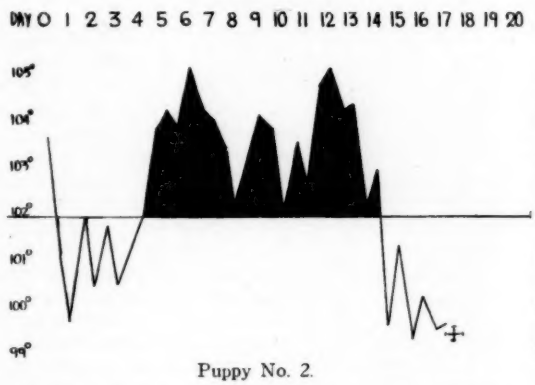
Finally, I would sum up by saying, as Dr. Stamp inferred in his Introduction, that so many disease conditions are associated directly or indirectly with environment that as a corollary the real answer to the control of these diseases is good husbandry.



Puppy No. 1.

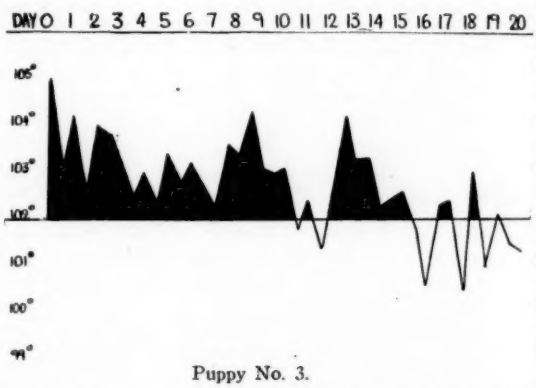


Puppy No. 5.

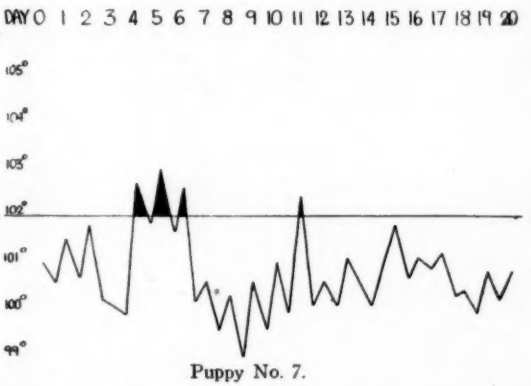


Puppy No. 2.

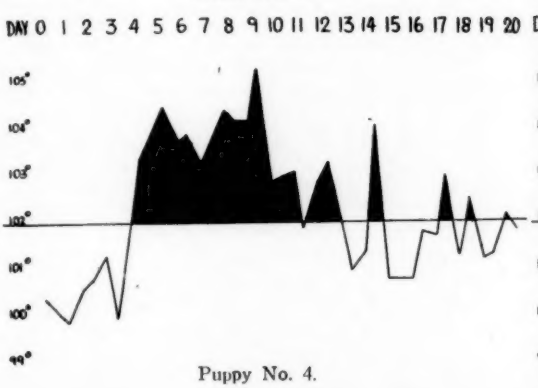
Puppy No. 6.



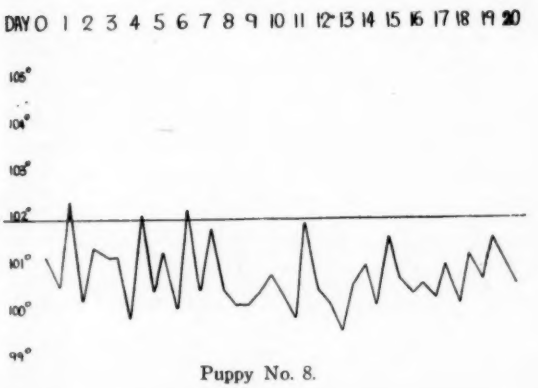
Puppy No. 3.



Puppy No. 7.



Puppy No. 4.



Puppy No. 8.

FIG. 2
CLINICAL RESPONSES
DAY OF APPEARANCE OF SYMPTOMS

Puppy number	Conjunctival discharge		Diarrhoea		Neutralising bodies to lapinised rinderpest virus
	Mucoid	Purulent	Simple	Haemorrhagic	
Controls :					
1	—	12	11	—	+++
2	6	12	9	14	Died 17
3	9	12	9	—	+++
4	6	12	10	—	+
Principals :					
5	—	—	—	—	+++
6	—	—	—	—	+++
7	—	—	—	—	+++
8	—	—	—	—	+++

4 to day 14 when No. 2 started to collapse. It died on day 17. The temperature response of No. 1 was similar but delayed until day 7, whilst that of No. 3 was raised from the beginning as the result of an abscess which developed immediately at the site of the injection. It was treated with procaine penicillin on day 5. The clinical symptoms of classical distemper, *e.g.* conjunctival and nasal discharge and diarrhoea, etc., were noted in all four controls after the first week. All survivors showed high titres of neutralising bodies for lapinised virus except No. 4 which showed a slight one. Serum from each surviving dog was also sent to the Wellcome Research Laboratories and was tested for complement-fixing bodies against canine distemper; none was detected. One or two samples of known distemper-positive and negative dogs' sera sent from England were likewise found not to contain neutralising bodies to lapinised virus when tested by Mr. Scott at Kabete.

Summary

A dog population which was constantly, if unintentionally, exposed to rinderpest infection through unique conditions of feeding was observed over the years to be curiously free from canine distemper. A group of distemper-susceptible dogs were bred; half were injected with virulent rinderpest virus and after 25 days these and the remaining half were challenged with potent distemper virus. Those injected with rinderpest virus remained healthy; those that were not so treated developed classical symptoms of distemper.

Acknowledgments.—The authors acknowledge with thanks the facilities provided by the Director of Veterinary Services, Kenya, and the Director of Veterinary Research, Wellcome Research Laboratories, Beckenham, Kent.

BRISTOL UNIVERSITY APPOINTMENT

The Council of the University has approved the election to Readership of Dr. J. A. Laing in Veterinary Science.

In Parliament

Slaughter-houses

MR. J. E. B. HILL (May 30th) asked the Minister of Agriculture, Fisheries and Food when he expects to bring forward regulations prescribing standards for slaughter-houses under existing powers; and if he will now inform the House when he will introduce legislation to implement the Government's long-term policy for slaughter-houses.

MR. GODBER: The necessary regulations cannot be made under existing powers. My right hon. Friend proposes to seek additional powers in the legislation to which my hon. Friend refers; this will be introduced immediately if time can be found in the Parliamentary programme. Meanwhile, as a guide to those planning to build or improve slaughter-houses, my right hon. Friend hopes shortly to publish drafts of regulations to prescribe certain of the proposed standards.

MR. HILL: Can my hon. Friend confirm that between the promulgation of the forthcoming regulations and their enforcement reasonable time and opportunity will be allowed to make good any defects in existing slaughter-houses *vis-à-vis* the new regulations?

MR. GODBER: I should think that there is no doubt about that. The whole thing will take us some time, and we have not yet even got to the legislation. I should say that there is no real danger there.

MR. T. WILLIAMS: In view of the urgency of the problem, may I ask the hon. Gentleman whether he is fully appreciative of the tremendous losses to producers and/or to the Treasury through a failure to make the maximum use of by-products from the utterly inadequate existing slaughter-houses?

MR. GODBER: I fully agree that there is a great need to conserve the by-products. We are very much alive to the problem, and hope to make some progress next Session.

Artificial Insemination Stations
(Beef Shorthorn Bulls)

MR. TURTON (May 30th) asked the Minister of Agriculture, Fisheries and Food what arrangements he is making for the use of beef shorthorn bulls at artificial insemination centres in England and Wales, in view of their value for crossing purposes.

MR. GODBER: Operators of artificial insemination stations are now permitted to use beef shorthorn bulls subject to approval in the same way as bulls of other breeds.

MR. TURTON: While I congratulate my hon. Friend upon the wisdom of that decision, in which I am personally interested, may I ask whether he can say at how many centres advantage is being taken of this option?

MR. GODBER: So far as I am aware, no requests have yet been made in England for approval of beef shorthorn bulls, but, of course, as and when requests are made, they will be considered.

The 1957 Annual Congress

SOCIAL PROGRAMME

THE events of the Congress are taking place mainly at three centres, the Arts School, the Department of Zoology and the School of Veterinary Medicine.

At the Arts School, in addition to lecture theatres for sectional meetings, there will be the B.V.A. office, Congress information and Press offices, the Trade Exhibition and a hall for coffee, buffet luncheons and tea. This hall provides a convenient place for members and their friends to meet.

On arrival members will be given a brief-case which will contain not only advance copies of sectional papers but a guide to Cambridge and the University, road map, scientific programme, exhibition programme and a booklet giving suggestions for museums, art galleries, cinemas and theatres to help those who wish to plan their own programme for the week.

Special buses will be available not only for tours but to transport people to and from the School of Veterinary Medicine which is about 1½ miles from the Arts School.

The Trade Exhibition in the Arts School will be open daily from 9.30 to 6.0. The Veterinary Scientific Exhibition consisting of over 100 demonstrations covering many fields of veterinary activity will be open daily from 9.0 to 5.0 in the Department of Zoology.

At the Arts School, coffee can be obtained every day from 10.0 to 11.0 and a buffet luncheon from 12.45 to 2.0. Tea will be served daily at 3.25 either at the Arts School or at the School of Veterinary Medicine according to where the papers are being read.

On Thursday afternoon golf competitions will be held in Cambridge, and names and handicaps should be sent to S. F. J. Hodgman, A.H.T. Canine Centre, Kennett, near Newmarket. The Club will also welcome members who would like to play at any other time during the week of Congress.

The Congress Information office situated in the Arts School is available for answering questions and to give the maximum help to visitors to plan their week.

The following programme gives an outline of some of the events which have already been organised by the Eastern Counties Veterinary Society for those not attending all the Congress professional and scientific meetings.

Programme Details

Ladies' programme, special tours, exhibitions, scientific films and evening functions.

Sunday, August 25th

Afternoon

2.30—6.0 Congress Office for general information and inquiries open at Arts School.

Evening

6.30 Choral Evensong. University Church of Great St. Mary's.

8.30 Eastern Counties Veterinary Society At Home at Winter Gardens, University Arms Hotel.

Monday, August 26th

Morning

9.30—10.45 Official Opening of Congress.

10.45 Opening of Trade Exhibition.

10.30—11.30 Ladies meet for coffee in Arts School.

11.15 Short conducted tour of Colleges for ladies, starting from the Arts School.

Afternoon

2.0 Ladies' coach tour to include Ely Cathedral, the American War Memorial and Madingley, with tea at St. Ives.

2.15 Congress tour of the Animal Health Trust's Equine Research Station and Canine Centre, Newmarket, with tea at Lanwades Park.

5.0—6.30 Tour of School of Veterinary Medicine.

Evening

9.0 Official Reception at the Old Schools.

Tuesday, August 27th

Morning

10.0 Ladies' Guild A.G.M. to which all ladies attending the Congress are invited, followed by coffee. (School of of Veterinary Medicine.)

11.30 Ladies' tour of School of Veterinary Medicine.

Afternoon

2.15 Ladies' conducted tour of University Library.

2.15—3.25 Tour of School of Veterinary Medicine.

3.30 Tea.

3.45—4.55 Tour of School of Veterinary Medicine.

4.15 Ladies' informal tea at Garden House Hotel.

5.30—6.45 Films (Art School).

Evening

8.45—1.0 Ladies' Guild Dance at Dorothy Ballroom.

Wednesday, August 28th

Morning

10.0 Ladies meet for coffee at Arts School.

10.30 Whole day tour through West Suffolk with visits to include Kedington, Clare, Lavenham, Melford Hall.

Afternoon

5.10—6.15 Films (Arts School).

Evening

7.45 for 8.15 B.V.A. Annual Banquet at the Guildhall.

Thursday, August 29th

Morning

10.0 Ladies meet for coffee at Arts School.

10.30 Tour of colleges and city for ladies.

Afternoon

1.0 Visit to Bayers Biological Institute at Newmarket, with luncheon and tea. Numbers limited to 56. No charge.

2.15 Golf Competition at Gog Magog Golf Club, Cambridge.

(*Continued on page* 587)

THE ANNUAL B.V.A. CONGRESS, 1957, AT CAMBRIDGE

August 25th to 31st

PROGRAMME OF PAPERS

(Reprints of Papers for Sectional Meetings only will be obtainable in advance if applied for on the ticket form)

Monday, Aug. 26th	MORNING		AFTERNOON		
9.30–10.45	11.0	11.30–12.45	2.15–3.25	3.45–4.55	5.0–6.30
Official Opening of Congress Opening of Trade Exhibition	Council Meeting (*Arts School*)	**Presidential Address,** E. R. Callender Annual General Meeting of the B.V.A. (*Lecture Theatre, Department of Zoology*)	Immunological phenomena in parasitic diseases *Author :* Dr. E. J. L. Soulsby *Openers :* Dr. A. M. Dunn K. B. Sinclair *Chairman :* Dr. E. L. Taylor (*Lecture Theatre, School of Veterinary Medicine*)	The general examination of the bull for soundness with special reference to the assessment of fertility *Author :* P. G. Hignett *Opener :* L. E. A. Rowson *Chairman :* C. T. Murphy (*Lecture Theatre, School of Veterinary Medicine*)	**Tour of School of Veterinary Medicine**
			Tour of Animal Health Trust Equine Research Station and Canine Centre		
Tuesday, Aug. 27th	MORNING		AFTERNOON		
9.15–10.30	11.0–11.45	12.0–12.45	2.15–3.25	3.45–4.55	5.30–6.45
Myopathic conditions in animals *Author :* Dr. K. L. Blaxter *Opener :* Dr. J. N. Walton (Myopathy in Man) *Chairman :* Dr. W. R. Wooldridge (*Arts School*)	**Plenary Session** **Collateral hazards from crop spraying** *Author :* Professor Sir Solly Zuckerman, F.R.S. *Chairman :* E. R. Callender (*Lecture Theatre, Department of Zoology*)	**Research problems in animal reproduction** *Author :* Dr. T. R. R. Mann, F.R.S. *Chairman :* W. C. Miller (*Lecture Theatre, Department of Zoology*)	Bacterial endocarditis in cattle *Author :* E. T. Rees Evans *Openers :* P. J. N. Pinsent Dr. S. D. Elliott *Chairman :* Dr. A. W. Stableforth (*Lecture Theatre, School of Veterinary Medicine*)	Mucosal disease *Author :* R. A. Huck *Openers :* A. L. Wilson Dr. A. O. Betts *Chairman :* C. H. Downe (*Lecture Theatre, School of Veterinary Medicine*)	Films (*Arts School*)
Oedema disease of swine *Author :* J. F. Timoney *Opener :* M. K. Lloyd *Chairman :* D. F. Oliver (*Arts School*)			**Tour of School of Veterinary Medicine**	**Tour of School of Veterinary Medicine**	
Wednesday, Aug. 28th	MORNING		AFTERNOON		
9.15–10.30	11.0–11.45	12.0–12.45	2.15–3.25	3.45–4.55	5.10–6.15
Physiological foundations of milk production and lactational disorders *Author :* Dr. B. A. Cross *Opener :* Dr. A. Marr *Chairman :* Professor E. C. Amoroso, F.R.S. (*Arts School*)	**Plenary Session** **Veterinary and human medicine** *Author :* Professor A. L. Banks *Chairman:* Professor L. P. Pugh (*Lecture Theatre, Department of Zoology*)	**Studies of the normal animal in relation to disease** *Author :* Sir William Slater *Chairman :* J. N. Ritchie (*Lecture Theatre, Department of Zoology*)	Respiratory diseases of sheep *Author :* A. J. Stevens *Opener :* G. R. Smith *Chairman :* D. Cameron (*Arts School*)	Enterotoxaemia of sheep *Authors :* Dr. J. J. Bullen and Mrs. Irene Batty *Opener :* W. T. Rowlands *Chairman :* Dr. K. C. Sellers (*Arts School*)	Films (*Arts School*)
The treatment of fractures in farm animals *Author :* J. Hickman *Opener :* A. C. Shuttleworth *Chairman :* Professor A. Messervy (*Arts School*)			Some problems of reproduction in the mare *Author :* F. T. Day *Opener :* C. S. Haselden *Chairman :* F. G. Waddington (*Arts School*)	Convulsive syndromes in new-born foals *Authors :* L. W. Mahaffey and P. Rossdale *Opener :* Dr. A. C. Fraser *Chairman :* P. J. Mitchell (*Arts School*)	

Thursday, Aug. 29th — MORNING — AFTERNOON

9.15–10.30	11.0–11.45	12.0–12.45	2.15–3.25	3.45–4.55	5.15–6.45
Some diseases of sucking pigs *Author :* Dr. R. F. W. Goodwin *Opener :* H. I. Field *Chairman :* Professor H. G. Lamont (*Arts School*)	**Plenary Session** **The role of immunology in biology and medicine** *Author :* Dr. R. R. A. Coombs *Chairman :* Sir Alan Drury, F.R.S. (*Lecture Theatre, Department of Zoology*)	**Some factors which may influence the aetiology of diseases of the young** *Author :* Professor R. Lovell *Chairman :* Professor W. I. B. Beveridge (*Lecture Theatre, Department of Zoology*)	Studies in Scrapie *Author :* A. C. Palmer *Opener :* Dr. W. S. Gordon *Chairman :* Dr. R. E. Glover (*Arts School*)	The natural history of parasitic bronchitis *Authors :* Dr. W. F. H. Jarrett Dr. W. I. M. McIntyre F. W. Jennings and Dr. W. Mulligan *Opener :* W. H. Parker *Chairman :* J. J. Low (*Arts School*)	**Tour of School of Veterinary Medicine**
Present-day problems in veterinary therapeutics *Author :* Professor G. F. Boddie *Opener :* A. H. Dawson *Chairman :* J. McConnachie Ingram (*Arts School*)			Films (Small animals) (*Arts School*)	Pathological differentiation of the diseases of the central nervous system of the pig *Author :* J. T. Done *Opener :* J. B. M. Gellatly *Chairman :* E. Cotchin (*Arts School*)	
		Visit to Bayer Biological Institute 1 p.m. (limited to 56)			

Friday, Aug. 30th — MORNING — AFTERNOON

9.15–10.30	11.0–11.45	2.15–3.25	3.30–4.40	5.40–6.30
Some respiratory diseases of pigs *Author :* P. Whittlestone *Opener :* W. A. Noble *Chairman :* Dr. W. S. Gordon (*Arts School*)	**Plenary Session** **Some clinical observations on the radiotherapy and chemotherapy of malignant tumours in dogs** *Authors :* Professor J. S. Mitchell, F.R.S., and I. A. Silver *Chairman :* Professor T. J. Bosworth (*Lecture Theatre, Department of Zoology*)	The diagnosis and surgical correction of some abnormal stifle conditions in the dog (with film) *Author :* W. B. Singleton *Openers :* M. Young K. M. Dyce *Chairman :* R. N. Phillips (*Lecture Theatre, School of Veterinary Medicine*)	The training, management and employment of various categories of dogs used by the Army *Author :* J. H. Wilkins *Opener :* N. Liakoff *Chairman :* S. F. J. Hodgman (*Lecture Theatre, School of Veterinary Medicine*)	**Demonstration of Dog Handling by the R.A.V.C.** (*School of Veterinary Medicine*)
The relationship of soundness and conformation in the horse *Author :* H. W. Dawes *Opener :* E. Brayley Reynolds *Chairman :* E. Wilkinson (*Arts School*)		**Tour of Houghton Poultry Research Station**		

Saturday, Aug. 31st — Closing meeting of Congress. — First meeting of the Council, 1957–8.

The Social Programme (*Continued from page* 585)

2.30 Ladies' visit to Sawston Hall (with tea at Sawston Hall).

5.15—6.45 Tour of School of Veterinary Medicine.

Evening

Alumnus Association dinners.

Ladies' party at Arts Theatre with buffet supper.

8.45—10.30 Scientific Films with introductory speakers (Arts School).

Friday, August 30th

Morning

12.15 Congress photograph.

Afternoon

2.15 Tour of Houghton Poultry Research Station.

4.40 Garden Party at School of Veterinary Medicine.

5.40 Demonstration of war dogs and dog handling by R.A.V.C. (The Houghton tour will return in time for this demonstration.)

Evening

9.0—2.0 Presidential Reception and Dance at the Guildhall.

DETAILS OF AUTHORS AND OPENING SPEAKERS

Professor A. L. BANKS, M.A., M.D., F.R.C.P., D.P.H., Dept. of Human Ecology, Univ. of Cambridge. (*Wed., 11.0 a.m.*)

Mrs. IRENE BATTY, B.SC., Wellcome Research Laboratories, Beckenham. (*Wed., 3.45 p.m.*)

Dr. A. O. BETTS, M.A., PH.D., B.SC., M.R.C.V.S., Dept. of Animal Pathology, Univ. of Cambridge. (*Tues., 3.45 p.m.*)

Dr. K. L. BLAXTER, D.SC., PH.D., N.D.A., The Hannah Dairy Research Institute, Kirkhill. (*Tues., 9.15 a.m.*)

Professor G. F. BODDIE, B.SC., M.R.C.V.S., F.R.S.E., Dept. of Veterinary Medicine, Royal (Dick) School of Veterinary Studies, Edinburgh Univ. (*Thurs., 9.15 a.m.*)

Dr. J. J. BULLEN, PH.D., M.R.C.V.S., Rowett Research Institute, Bucksburn. (*Wed., 3.45 p.m.*)

E. R. CALLENDER, O.B.E., M.R.C.V.S., Animal Health Division, Ministry of Agriculture. (*Mon., 11.30 a.m.*)

Dr. R. R. A. COOMBS, PH.D., B.SC., M.R.C.V.S., Dept. of Pathology, Univ. of Cambridge. (*Thurs., 11.0 a.m.*)

Dr. B. A. CROSS, M.A., PH.D., B.SC., M.R.C.V.S., Dept. of Anatomy, Univ. of Cambridge. (*Wed., 9.15 a.m.*)

H. W. DAWES, C.B.E., F.R.C.V.S., West Bromwich. (*Fri., 9.15 a.m.*)

A. H. DAWSON, M.R.C.V.S., North Walsham. (*Thurs., 9.15 a.m.*)

F. T. DAY, F.R.C.V.S., Newmarket. (*Wed., 2.15 p.m.*)

J. T. DONE, B.V.SC., M.R.C.V.S., Ministry of Agriculture Veterinary Laboratory, Weybridge. (*Thurs., 3.45 p.m.*)

Dr. A. M. DUNN, PH.D., M.R.C.V.S., Animal Diseases Research Association, Moredun Institute, Edinburgh. (*Mon., 2.15 p.m.*)

K. M. DYCE, B.SC., M.R.C.V.S., Dept. of Anatomy, Royal Veterinary College, Univ. of London. (*Fri., 2.15 p.m.*)

Dr. S. D. Elliott, M.D., Dept. of Animal Pathology, Univ. of Cambridge. (*Tues., 2.15 p.m.*)

E. T. REES EVANS, M.A., B.SC., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Tues., 2.15 p.m.*)

H. I. FIELD, M.SC., M.R.C.V.S., Veterinary Investigation Centre, Cambridge. (*Thurs., 9.15 a.m.*)

Dr. A. C. FRASER, PH.D., B.V.SC., M.R.C.V.S., Wokingham. (*Wed., 3.45 p.m.*)

J. B. M. GELLATLY, B.SC., M.R.C.V.S., Dept. of Veterinary Pathology, Royal (Dick) School of Veterinary Studies, Edinburgh Univ. (*Thurs., 3.45 p.m.*)

Dr. R. F. W. GOODWIN, M.A., PH.D., B.SC., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge (*Thurs., 9.15 a.m.*)

Dr. W. S. GORDON, C.B.E., PH.D., M.R.C.V.S., F.R.S.E., A.R.C. Field Station, Compton. (*Thurs., 2.15 p.m.*)

C. S. HASELDEN, M.R.C.V.S., Aylesbury. (*Wed., 2.15 p.m.*)

J. HICKMAN, M.A., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Wed., 9.15 a.m.*)

P. G. HIGNETT, M.R.C.V.S., Dept. of Veterinary Surgery, Univ. of Glasgow. (*Mon., 3.45 p.m.*)

R. A. HUCK, B.SC., M.R.C.V.S., Ministry of Agriculture Veterinary Laboratory, Weybridge. (*Tues., 3.45 p.m.*)

Dr. W. F. H. JARRETT, PH.D., M.R.C.V.S., Dept. of Veterinary Medicine, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

F. W. JENNINGS, B.SC., M.AGR., Dept. of Veterinary Biochemistry, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

Capt. N. LIAKOFF, M.B.E., Guide Dogs for the Blind Association, Caversham. (*Fri., 3.30 p.m.*)

M. K. LLOYD, B.V.SC., M.R.C.V.S., Ministry of Agriculture Veterinary Laboratory, Weybridge. (*Tues., 9.15 a.m.*)

Professor R. LOVELL, D.SC., PH.D., M.R.C.V.S., D.V.S.M., Dept. of Pathology, Royal Veterinary College, Univ. of London. (*Thurs., 12.0 noon.*)

Dr. W. I. M. McINTYRE, PH.D., M.R.C.V.S., Dept. of Veterinary Medicine, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

L. W. MAHAFFEY, B.V.SC., A.H.T. Equine Research Station, Newmarket. (*Wed., 3.45 p.m.*)

Dr. T. R. R. MANN, M.D., SC.D., PH.D., F.R.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Tues., 12.0 a.m.*)

Dr. A. MARR, B.SC., PH.D., M.R.C.V.S., Sevenoaks. (*Wed., 9.15 a.m.*)

Professor J. S. MITCHELL, C.B.E., M.A., PH.D., M.B., B.CHIR., F.R.S., Dept. of Radiotherapeutics, Univ. of Cambridge. (*Fri., 11.0 a.m.*)

Dr. W. MULLIGAN, M.SC., PH.D., Dept. of Veterinary Biochemistry, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

W. A. NOBLE, M.R.C.V.S., March. (*Fri., 9.15 a.m.*)

A. C. PALMER, M.A., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Thurs., 2.15 p.m.*)

W. H. PARKER, B.SC., M.R.C.V.S., N.D.A., Veterinary Investigation Centre, Tettenhall. (*Thurs., 3.45 p.m.*)

P. J. N. PINSENT, B.V.SC., M.R.C.V.S., Dept. of Veterinary Medicine, Univ. of Liverpool. (*Tues., 2.15 p.m.*)

E. BRAYLEY REYNOLDS, O.B.E., M.R.C.V.S., Newmarket. (*Fri., 9.15 a.m.*)

P. D. ROSSDALE, B.A., M.R.C.V.S., Newmarket. (*Wed., 3.45 p.m.*)

W. T. ROWLANDS, M.R.C.V.S., D.V.S.M., Veterinary Investigation Centre, Bangor. (*Wed., 3.45 p.m.*)

L. E. A. ROWSON, O.B.E., M.R.C.V.S., Cambridge and District Cattle Breeders Ltd., Cambridge. (*Mon., 3.45 p.m.*)

A. C. SHUTTLEWORTH, M.V.SC., F.R.C.V.S., Dept. of Veterinary Surgery, Univ. of Liverpool. (*Wed., 9.15 a.m.*)

I. A. SILVER, M.A., M.R.C.V.S., Dept. of Anatomy, Univ. of Cambridge. (*Fri., 11.0 a.m.*)

K. B. SINCLAIR, M.V.SC., M.R.C.V.S., Dept. of Animal Husbandry, University College of Wales. (*Mon., 2.15 p.m.*)

W. B. SINGLETON, M.R.C.V.S., A.H.T. Canine Centre, Newmarket. (*Fri., 2.15 p.m.*)

Sir WILLIAM SLATER, K.B.E., D.SC., F.R.I.C., Agricultural Research Council, London. (*Wed., 12 noon.*)

G. R. SMITH, M.R.C.V.S., D.V.S.M., DIP. BACT., Animal Diseases Research Association, Moredun Institute, Edinburgh. (*Wed., 2.15 p.m.*)

Dr. E. J. L. SOULSBY, M.A., PH.D., M.R.C.V.S., D.V.S.M., Dept. of Animal Pathology, Univ. of Cambridge. (*Mon., 2.15 p.m.*)

A. J. STEVENS, B.V.SC., M.R.C.V.S., DIP. BACT., Veterinary Investigation Centre, Cambridge. (*Wed., 2.15 p.m.*)

J. F. TIMONEY, M.R.C.V.S., Veterinary Research Laboratory, Dept. of Agriculture, Dublin. (*Tues., 9.15 a.m.*)

Dr. J. N. WALTON, M.D., M.R.C.P., Royal Victoria Infirmary, Newcastle upon Tyne. (*Tues., 9.15 a.m.*)

P. WHITTLESTONE, M.A., B.SC., M.R.C.V.S., Dept. of Animal Pathology, Univ. of Cambridge. (*Fri., 9.15 a.m.*)

Major J. H. WILKINS, B.SC., M.R.C.V.S., Royal Army Veterinary Corps. (*Fri., 3.30 p.m.*)

A. L. WILSON, M.R.C.V.S., Veterinary Laboratory, West of Scotland Agricultural College. (*Tues., 3.45 p.m.*)

M. YOUNG, M.R.C.V.S., Ealing. (*Fri., 2.15 p.m.*)

Professor Sir SOLLY ZUCKERMAN, C.B., M.A., M.D., D.SC., F.R.S., Dept. of Anatomy, Univ. of Birmingham. (*Tues., 11.0 a.m.*)

CHAIRMEN OF CONGRESS MEETINGS

Professor E. C. AMOROSO, PH.D., B.SC., M.B., B.CH., B.A.O., F.R.S.

Professor W. I. B. BEVERIDGE, M.A., D.V.SC.

Professor T. J. BOSWORTH, M.A., B.SC., M.R.C.V.S., D.V.S.M., Vice-President, Royal College of Veterinary Surgeons.

E. R. CALLENDER, O.B.E., M.R.C.V.S., President, British Veterinary Association.

D. CAMERON, M.R.C.V.S., D.V.S.M.

E. COTCHIN, M.R.C.V.S.

C. H. DOWNE, M.R.C.V.S.

Sir ALAN DRURY, C.B.E., M.A., M.D., F.R.C.P., F.R.S.

Dr. R. E. GLOVER, M.A., D.SC., F.R.C.V.S.

Dr. W. S. GORDON, C.B.E., PH.D., M.R.C.V.S., F.R.S.E.

S. F. J. HODGMAN, M.R.C.V.S.

J. MCCONNACHIE INGRAM, M.R.C.V.S., Vice-President, British Veterinary Association.

Professor H. G. LAMONT, O.B.E., D.SC., M.R.C.V.S.

J. J. LOW, M.R.C.V.S.

Professor A. MESSERVY, M.R.C.V.S.

Wm. C. MILLER, M.R.C.V.S., F.R.S.E., President, Eastern Counties Veterinary Society.

P. J. MITCHELL, M.R.C.V.S.

C. T. MURPHY, M.R.C.V.S.

D. F. OLIVER, B.SC., M.R.C.V.S.

R. N. PHILLIPS, M.R.C.V.S., D.V.S.M.

Professor L. P. PUGH, M.A., B.SC., F.R.C.V.S., Senior Vice-President, Royal College of Veterinary Surgeons.

J. N. RITCHIE, C.B., B.SC., F.R.C.V.S., D.V.S.M.

Dr. K. C. SELLERS, PH.D., B.SC., M.R.C.V.S., D.V.S.M.

Dr. A. W. STABLEFORTH, D.SC., M.R.C.V.S., D.V.S.M.

Dr. E. L. TAYLOR, C.B.E., D.V.SC., M.R.C.V.S., D.V.H., N.D.A., N.D.D.

F. G. WADDINGTON, B.V.SC., M.R.C.V.S.

E. WILKINSON, M.R.C.V.S., Senior Vice-President, British Veterinary Association.

Congress Coach and Bus Transport Arrangements

Buses have been booked to take visitors to the School of Veterinary Medicine for sectional meetings and tours. A weekly ticket inclusive of all these journeys (marked with an asterisk in the time-table below) can be obtained from the B.V.A. office. Separate tickets will be issued for other tours.

In general, transport leaves and returns to Tennis Court Road and Downing Street, which roads adjoin each other, with Bridge Street as an intermediary stopping place. Tennis Court Road and Downing Street are convenient for those attending meetings at the Arts School and Department of Zoology and for those staying at the University Arms Hotel, Downing College, Royal Hotel, Garden House Hotel, New Hall, and the Lion Hotel. Northampton Street and Bridge Street stopping points are next to Magdalene College and close to the Blue Boar Hotel.

Car parks nearest to the Arts School are the Lion car park off Downing Street and Guildhall Street (approximately 200 yards) and New Square (approximately 400 yards).

Monday, August 26th

Transport for School of Veterinary Medicine

*2.00 Buses labelled SVM leave Tennis Court Road.
*2.05 Pick up passengers at Bridge Street.
*6.30 Bus leaves School of Veterinary Medicine returning *via* Bridge Street to Downing Street.

Transport for tours to Animal Health Trust Equine Research Station and Canine Centre, Newmarket.

2.10 Buses labelled AHT leave Northampton Street.
2.15 Pick up passengers at Downing Street. At conclusion of tour buses will return *via* Bridge Street to Downing Street.

Transport for Ladies' Tour to Ely Cathedral

2.00 Coach leaves Tennis Court Road (labelled LT).
2.05 Pick up passengers at Bridge Street. Bus returns *via* Bridge Street to Downing Street.

Tuesday, August 27th

Transport for Ladies' Tour of School of Veterinary Medicine

10.00 Buses labelled LT leave Tennis Court Road.
10.05 Pick up passengers at Bridge Street.
12.35 Buses leave School of Veterinary Medicine returning *via* Bridge Street to Downing Street.

Transport for School of Veterinary Medicine

*2.00 Buses labelled SVM leave Tennis Court Road.
*2.05 Pick up passengers at Bridge Street.
*5.10 Buses leave School of Veterinary Medicine returning *via* Bridge Street to Downing Street.

Wednesday, August 28th

Transport for Ladies' Tour of West Suffolk

10.30 Buses leave Downing Street. For return journey buses will go *via* Bridge Street to Downing Street.

Thursday, August 29th

Transport for Tour to Bayer Biological Institute, Newmarket.

1.00 Bus leaves Downing Street.
2.20 Pick up passengers at Bridge Street. After tour bus will return *via* Bridge Street to Downing Street.

Transport for School of Veterinary Medicine

*5.05 Bus labelled SVM leaves Tennis Court Road.
*6.45 Bus returns *via* Bridge Street to Downing Street.

Transport for Ladies' Tour to Sawston Hall

2.20 Bus labelled LT leaves Northampton Street.
2.30 Pick up passengers at Downing Street. After tour bus will return *via* Bridge Street to Downing Street.

Friday, August 30th

Transport for School of Veterinary Medicine

*2.00 Buses labelled SVM leave Tennis Court Road.
*2.05 Pick up passengers at Bridge Street.
*4.30 Bus leaves Downing Street.
*6.35 Buses leave School of Veterinary Medicine returning *via* Bridge Street to Downing Street.

Transport for Tour to Houghton Poultry Research Station

2.05 Buses marked AHT leave Northampton Street.
2.15 Pick up passengers at Downing Street. Return transport leaves Houghton not later than 5.0 to go to School of Veterinary Medicine for demonstration at 5.40.
*6.35 Buses leave School of Veterinary Medicine returning *via* Bridge Street to Downing Street.

THE AGRICULTURAL RESEARCH COUNCIL

Professor J. E. Nichols, Professor of Agriculture (Animal Husbandry) in the University College of Wales, Aberystwyth, has, with the consent of the Acting Principal of the College, accepted an invitation from the Agricultural Research Council to be their Adviser on Sheep Research. As Adviser to the Council, Professor Nichols will keep under review research in progress on sheep, and will be responsible for bringing to the Council's notice matters in this field which call for their attention, including the need for additional research.

ROCKET FLIGHTS BY DOGS

Dogs, protected by diving suits, have returned alive from rocket flights in the upper atmosphere. These rocket tests, which were carried out in Russia, are reported to have carried the dogs on flights of up to 70 miles. The dogs are then said to have made a catapult parachute descent from 50 miles above the earth and a free fall from 25 miles. Their diving suits protected them from lack of oxygen.

Current Literature

BOOK REVIEWS

The Conformation of the Dog. By R. H. SMYTHE, M.R.C.V.S. Popular Dogs Publishing Co., Ltd., London. Price 18s.

In his book " The Conformation of the Dog," Mr. R. H. Smythe, M.R.C.V.S., has employed a method that would have commended itself to the late Toulouse-Lautrec. That great little Frenchman liked to draw his models in the nude and paint the clothes (if any) on them afterwards; on the same principle, Mr. Smythe gives us some excellent illustrations of skeletons of his subjects and puts flesh and skin over them.

The idea is effective as it is original in this type of work, more especially in those chapters dealing with the articulations of the vertebrae and limbs. These, together with the first chapter on the head, form a valuable guide to the novice breeder who is faced with the difficulty of selecting not only the best bitch to buy, but the best dog to sire her litter and the pup or pups best worth keeping. It is true that a good eye for a winner comes largely by practice, but the fundamental idea can be gained by reading works devoted to the subject.

It is, of course, necessary for the novice to read up his particular breed, but there is much in this book that applies to all breeds, notably the chapter on hereditary defects of conformation. It is satisfactory to note that the author is not afraid to tackle the vexed question of cryptorchidism, and emphasis is laid on the contradictory attitude of the Kennel Club with reference to this serious defect. While judges are instructed to ignore the condition of unilateral cryptorchidism (in other words a dog so affected can be put first in his breed or class), at the same time, the Kennel Club rules that a dog is liable to be disqualified by the Committee from winning any award if it is " affected by a tendency to reproduce any hereditary disease."

Breeders, even more than judges, are entitled to demand a clear and consistent ruling on a question of such importance to them, and we think it is high time the Kennel Club reconsidered their attitude. The whole of this chapter claims careful study by the novice breeder who cannot afford the losses consequent upon sterility or diseased litters.

We are glad to note that stress is laid on the importance of movement and action. Action is part of a breed characteristic and must be judged as such, but the universal rules for a good gait listed here deserve the attention of breeders and judges. The latter may easily attach too little importance to bad action since it may well result from an otherwise inapparent unsoundness. In the same way there is a tendency among some judges to be fascinated by a good head. It is admittedly a great asset to the appearance of a dog, but there is more of an animal behind, than in front of, his ears, and undue emphasis on the head is apt to ignore defects in conformation and movement.

Mr. Smythe has described his book as " A practical guide for judges, owners, breeders, and exhibitors," and in this sentence the important word is " practical."

We have seldom met with a work containing so much meat and so little packing, it deserves to be " inwardly digested " by both professionals and amateurs.

Heredopathology of Farm Animals (Erbpathologie der Landwirtschaftlichen Haustiere). By P. KOCH, H. FISCHER, & HILDEGUND SCHUMANN. 1957. 436 pp. Paul Parey, Berlin and Hamburg.

This book reviews the world literature dealing with inheritable disease conditions in farm animals (horses, cattle, pigs, sheep, goats, and poultry). All three authors have themselves contributed much to research in this field. The increasing use of artificial insemination was one of the reasons prompting the production of the book. Separate sections are devoted to each species and range in length from some 100 pages for cattle and poultry to about half this length for the other species. There is a useful glossary of genetic terms, and also a comprehensive bibliography of some 1,300 references arranged with their authors in alphabetical order. There are over 200 illustrations. A very wide range of world literature is covered, a high proportion of it in the English language. References as late as 1955 are included.

An enormous variety of conditions is included, ranging from those of undoubted genetic origin to conditions where at most a predisposition may be inherited. The book serves both to collect together and assess what is known, most of it from work done in the last 30 years, and also to show how much still remains to be elucidated. The precise method of inheritance is known for very few inherited defects in farm animals, and there is an urgent need for more adequate recording of pathological conditions which may be genetically transmitted and for further study of the pattern of their inheritance.

This book provides a valuable source of reference for all who are interested in inherited disease conditions in farm animals.

THE NUTRITION SOCIETY

At a recent meeting Dr. G. H. Bourne and Dr. A. J. Amos retired after five years' service as Hon. Secretary and Hon. Treasurer. Dr. R. J. L. Allen was elected Hon. Secretary and Dr. W. F. J. Cuthbertson Hon. Treasurer. The other officers and members of Council of the Society are: *President*: Dame Harriette Chick; *Hon. Editor*: Dr. S. K. Kon; *Hon. Programmes Secretary*: Miss D. F. Hollingsworth; *Ordinary Members of Council*: Dr. A. J. Amos, Mr. A. L. Bacharach, Dr. G. H. Bourne, Professor C. Fraser Brockington, Professor E. W. H. Cruickshank, Professor J. N. Davidson, Dr. O. Fitzgerald, Dr. R. H. Girdwood, Miss E. M. M. Hume, Dr. T. Mann, F.R.S., Mrs. F. S. Patton, Dr. A. T. Phillipson, Professor B. S. Platt, Dr. M. Pyke, Dr. J. A. B. Smith and Dr. E. M. Widdowson.

News and Comment

CONGRESS TICKETS AND PAPERS

May we draw attention to the loose inset which is enclosed in members' copies of this issue? It would be of great help to the General Secretary if those who propose to be present at Congress would complete and return the sheet at their earliest convenience, and certainly not later than August 10th, the date indicated at the head of the sheet.

Members who will not be at Congress are asked to note particularly the tear-off requisition slip for advance copies of papers. Owing to the weight of clerical work it is regretted that papers cannot be supplied after August 10th. All papers, including those read at the plenary sessions, will be published in full in the special Congress Proceedings number of THE VETERINARY RECORD in December.

NEW PRESIDENT OF THE R.C.V.S.

As we go to press we learn that Mr. G. N. Gould, J.P., M.R.C.V.S., has been elected President of the Royal College of Veterinary Surgeons for the year 1957-8. A biography of the new President and a portrait photograph will be published next week.

THE R.C.V.S. COUNCIL

At the Annual General Meeting of the R.C.V.S. Council on June 5th, two new members of Council, Sir Laurence Watkinson, K.B.E., C.B., M.C., and Commander John Francis Whitaker Maitland, M.P., were appointed by the Privy Council in place of Sir Thomas Dalling and Captain Duncan, M.P.

Sir Laurence Watkinson was born in Worcester in 1896 and educated at the Royal Grammar School, Worcester. During the First World War he served with the Worcester Regiment in France and Italy, and was awarded the M.C. and bar. He joined the Board of Inland Revenue in 1919, and remained with them until 1931, when he joined the Board of Trade. He was Deputy Secretary of the Ministry of Fuel and Power from 1947 to 1955, and then became Vice Chairman of Messrs. Harris Lebus, Ltd. He was created C.B. in 1944 and K.B.E. in 1949.

Commander John Francis Whitaker Maitland was born in Essex in 1903. He now lives in Lincolnshire, and has been Conservative M.P. for the Horncastle Division, Lincolnshire, since 1945.

The election of Mr. G. Atkinson, M.R.C.V.S., to the Council was also announced. A short biography of Mr. Atkinson was published in THE VETERINARY RECORD on March 16th of this year.

A full account of the very successful R.C.V.S. Day, which included the Annual General Meeting, will be published next week.

THE ROYAL SOCIETY OF HEALTH

A Cambridge Sessional Meeting will be held on Friday, June 21st, at 10.30 a.m., in The Guildhall, Cambridge. A paper entitled "The Nature of the Agents which Attack Food: With Special Reference to Meat" will be read by A. G. Kitchell, PH.D., of the Low Temperature Research Station, Cambridge.

HOLIDAY EXCHANGES

Germany

Exchange

Boy of 16 (Ekersburg/Munich, Bavaria) would like to visit U.K. between July 15th and September 2nd of this year, his family—consisting of parents and one other boy (13) and a girl (12)—receiving a British child of 12-16 years old for the same period. The family live near Munich and have a car; they can offer facilities for bathing and tennis, and the boy would like opportunities for tennis during his visit to the U.K.

Boy of 18 (Schwarzenfeld) seeks exchange visit to a family in the South of England between July 25th and the end of August. His family includes, besides himself, a sister of 13.

Boy of 18 (Kamen, Westfalen) would like to visit England between August 1st and September 1st, receiving an English boy at his home for a month's stay at any time except during this period.

CAUGHT THE ONE THAT GOT AWAY!

We are indebted to a correspondent for the following quotation from an Irish newspaper.

Professor H. G. Lamont, of Queen's University, Belfast, fishing on Lough Melvin, was able to add to his stock of fishing stories one of the fishiest that will ever be told amongst anglers and yet perfectly true in every detail. In calm weather with the lough like a sheet of glass he hooked a 12-lb. salmon and fished it for some minutes. His line broke leaving a length several yards long attached to the hook in the fish. His boatman, Charles Murphy, dexterously worked his oars to send the boat chasing after the line which caused a fine ripple on the calm water as the fish made off. Believe it or not, Murphy was able to catch up with the fish and plunge his hand to the broken line and catch it. It was a work of art following the moving fish as Professor Lamont re-tied the line firmly and began anew the fight which ended with the landing several minutes later of a beautiful 12-lb. salmon.

UNIVERSITY NEWS

Liverpool

The Senate of the University, at its meeting held on May 22nd, agreed that the degree of D.V.Sc. should be conferred on Mr. G. H. Arthur, M.V.SC., M.R.C.V.S., Reader in Veterinary Surgery, in the Royal Veterinary College, University of London.

At its meeting, held on May 28th, the Council of the University made the following appointment: Lecturer in Veterinary Parasitology—Mr. M. J. Clarkson, B.V.SC., B.SC., M.R.C.V.S.

THE COLONIAL VETERINARY SERVICE

Promotion. D. E. Macgregor, P.V.O., Kaduna, Northern Nigeria, becomes Chief Veterinary Officer (Animal Industries), Kaduna, Northern Nigeria.

New appointment. G. Owen, Veterinary Officer, Nyasaland.

TERCENTENARY OF WILLIAM HARVEY

Harvey's book, *De Motu Cordis,* in which he announced his discovery of the circulation of the blood, has been described as one of the most significant books that ever came from the press, and veterinary medicine owes almost as much as human medicine to this great scientist. *De Motu Cordis* was Harvey's first book, written 29 years before his death, and consisted of only 38 pages; inevitably he was limited by his lack of apparatus, but this book is considered by many to be one of the most admirable examples of reasoning based on experiment ever printed.

Harvey accepted the current belief that the blood was " the primary seat of the soul," but rejected the theory that the blood ebbed and flowed in the great vessels. " It is plain from the structure of the heart," he wrote, " that the blood is passed continuously through the lungs to the aorta as by the two clacks of a water bellows to raise water."

Like many pioneers, Harvey raised a storm of hostility by the novelty of his ideas, and from the publication of *De Motu Cordis* to his death on June 3rd, 1657, he lived a troubled and unhappy life. He was a staunch Royalist, and to his bitter distress much of his work was destroyed in an attack on his house by Parliamentary mobs. Unpublished work on the lungs and respiration, on motion and senses, and the natural history of many kinds of animals was destroyed, and Harvey spoke of the destruction of his notes on insects as " the greatest crucifying that ever he had in all his life." At one time he discussed with his friends the possibility of endowing a professorship of experimental philosophy at Cambridge with a laboratory and herb garden attached, but his hatred of the Commonwealth, and the thought that he might be supporting its religious and political ideas, deterred him.

Towards the end of his life he was revered as by far the greatest scientist of his day, but his outlook was darkened by years of strife and controversy and by painful gout. He was buried at Hempstead, in Essex, in a chapel built by his brother Eliab a few years earlier.

MR. JAMES A. McKINNON

We record with regret the death of Mr. James Alexander McKinnon, B.SC., M.R.C.V.S., D.V.S.M., late Veterinary Officer of the Ministry of Agriculture, at Dumfries. He graduated at Edinburgh on July 21st, 1934, and died on May 26th, 1957, aged 45 years. Mr. McKinnon, who had a brilliant college career, served as a Veterinary Officer at Dumfries from 1938 until recently when he was forced to retire because of ill health.

Representing the profession at his funeral on May 28th, at Lochmaben Cemetery, Dumfriesshire, were Messrs. T. B. Fleming, J. Howatson, A. B. Kerr, A. M. McNiven, D. W. J. Munro, and J. K. Smith.

THE LATE MR. VINCENT BOYLE, C.M.G., M.R.C.V.S.

The Chief Veterinary Officer, Ministry of Agriculture, Fisheries and Food, has received the undermentioned communication from Mr. P. D. Baylis, Superintending Veterinary Officer in the Argentine.

You may like to know that on May 5th, the anniversary of Vincent Boyle's death, my wife and I met a number of veterinary officials of the Ministry of Agriculture and Live-stock, and veterinarians of the Laboratorios Afta at the British cemetery. The occasion, as described by the Ministry in a press notice, was to pay homage and unveil a plaque to his memory.

In the absence of Dr. Coviella, the Director-General, my wife was asked to unveil the plaque. I made a short, suitable speech, in which I told them that I would write to you and to his family informing you and them of this gracious act. The inscription reads:—

" Capitan Vincent Boyle
A un amigo de Argentina
Sus amigos Argentinos
1956 - 5 - V 1957."

PERSONAL

Births

PIERSON.—On May 3rd, 1957, to Marthe, wife of Eric Pierson, M.R.C.V.S., of South Lodge, Marden, Kent, a daughter, Michelle Louise, a sister for Janet.

WILLIAMS.—To Margaret, wife of W. Douglas Williams, on May 21st, 1957, of Newtown Infirmary, Mont., a son, Huw Rhys, brother for Richard.

VALLELY.—On May 18th, 1957, to Margaret Helen (*née* Larkin) and Thomas F. Vallely, M.R.C.V.S., of 18, The Paddock, Codsall, Wolverhampton, a son, Christopher John.

Marriage

CALDWELL—CALDWELL.—On June 1st, 1957, at St. Mark's Church, Worsley, Ben A. W. Caldwell, B.V SC., M.R.C.V.S., to Betty Caldwell of Boothstown, Manchester.

COMING EVENTS

June

12th (Wed.). Annual General Meeting of the Midland Counties Veterinary Association at the Birmingham Medical Institute, 36, Harborne Road, Birmingham, 15, 2.30 p.m.

Annual Meeting of the R.A.V.C. Golfing Society at the North Hants Golf Club, Fleet, 10 a.m.

Meeting of the Scottish Branch, B.V.A., at the Royal (Dick) School of Veterinary Studies, 2.30 p.m.

13th (Thurs.). Annual Dinner of the R.A.V.C. Officers' Club at the Grosvenor House, Park Lane, London, W.1.

14th (Fri.). Annual Dinner of the Chiron Club at the Royal Hotel, Bristol, 7 p.m.

19th (Wed.). Meeting of the Essex Veterinary Society at the Farm Live-stock Disease Research Station, Animal Health Trust, Lilystone Hall, Stock, Essex, 2.30 p.m.

20th (Thurs.). Meeting of the Western Counties Veterinary Association at the Bristol Hotel, Newquay, 2.15 p.m.

Meeting of the Lancashire Veterinary Association at the Midland Hotel, Manchester, 8 p.m.

21st (Fri.). Ordinary General Meeting of the South Wales Division in the Cambrian Hotel, Saundersfoot, 2.30 p.m.

General Meeting of the South Wales Division at the Cambrian Hotel, Saundersfoot, Pembrokeshire, 2 p.m.

August

25th-31st. 75th Annual General Meeting and Congress of the B.V.A. at Cambridge.

BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS IN LONDON

Wednesday, July 10th, at 7, Mansfield Street, London, W.1.

10.00 a.m. Veterinary State Medicine Committee.
11.30 a.m. Farm Live-stock Committee.
2.15 p.m. Home Appointments Committee.

Thursday, July 11th, at 7, Mansfield Street, London, W.1.

10.00 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Small-animals Committee.
12.00 noon Finance Sub-committee.
2.15 p.m. General Purposes and Finance Committee.

Friday, July 12th, at Connaught Rooms, London, W.C.2.

10.30 a.m. Council Meeting.

R.C.V.S. Examinations

June

27th (Thurs.). M.R.C.V.S. Written Examinations.
28th (Fri.). M.R.C.V.S. Written Examinations.

July

1st (Mon.). M.R.C.V.S. Practical and Oral Examinations commence (Panels "A" and "B").

FOOT-AND-MOUTH DISEASE

The area described in the schedule below shall cease to be an Infected Area for the purpose of preventing the spread of foot-and-mouth disease on June 11th, 1957:—

The City and County Borough of Birmingham.

IN THE COUNTY OF WARWICK

The Borough of Solihull.
The Petty Sessional Division of Solihull.

In the Petty Sessional Division of Coleshill: The parishes of Castle Bromwich, Water Orton, Shustoke, Kingshurst, Coleshill, Maxstoke, Little Packington, Great Packington and Meriden and so much of the parish of Bickenhill as lies within the Petty Sessional Division.

The area described in the schedule below shall cease to be an Infected Area for the purpose of preventing the spread of foot-and-mouth disease on June 15th, 1957:—

IN THE COUNTY OF ESSEX

The Borough of Harwich.
The Petty Sessional Division of Harwich.
In the Petty Sessional Division of Tendring: The parishes of Lawford, Manningtree, Mistley, Bradfield, Wrabness, Little Bromley, Little Bentley, Wix, Tendring, Great Oakley and Beaumont cum Moze.

IN THE COUNTY OF EAST SUFFOLK

In the Petty Sessional Division of Orwell: The parishes of Bentley, Freston, Woolverstone, Tattingstone, Chelmondiston, Holbrook, Shotley, Brantham, Stutton, Harkstead and Ewarton.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Essex. Valley House, Purleigh, Chelmsford (May 28).
Fife. Cults Mill Farm, Cupar (May 28).
Norfolk. Grove Cottage, Woodton, Bungay (May 27).
Renfrew. Atlands Farm, Inchinnan (May 27).
Yorks. The Bungalow, Ripon Road, Dishforth, Thirsk (May 30).

Fowl Pest

Banff. Mill House, Auchindoun, Dufftown (May 29).
Lancs. Ferriby Farm, Marsh Lane, Longton (May 27); Marsh Farm, Hesketh Bank; The Poultry Farm, Gill Lane, Longton; Sandside Farm, Pilling; 4, Kearsley Avenue, Tarleton (May 28); Myersdale, Hall Lane, Longton; Moorfield, Six Acre Lane, Longton; Steadson, Skip Lane, Hutton; School Farm, Treales, Kirkham (May 30).
Leics. 22, Chapel Street, Enderby (May 29).
Yorks. Allotments, Stepney Grove, Scarborough (May 30).

Swine Fever

Cambs. Brewery Farm, Meldreth, Royston (May 28).
Ches. Ball Farm, Hankelow, Crewe (May 27).
Derby. Fox Covert Farm, Aston-on-Trent (May 29).
Hants. Flexcombe Farm, Liss (May 27)
Herts. 9, Batchworth Heath Farm, Rickmansworth (May 27).
Kent. Truggers Farm, Chiddingstone Heath, Edenbridge (May 28).
Lancs. Whitefield House, Ingol, Preston (May 27).
Leics. 2, Railway Station Cottages, Stathern, Melton Mowbray (May 27).
London. Courtlands Avenue Nursery, S.E.12 (May 28).
Norfolk. Brick Kiln Farm, Great Ellingham, Attleborough (May 27).
Oxford. Hobbs Hole Farm, Sandford St. Martin; Cleveley, Enstone (May 27). Bottom Farm, Checkendon (May 29).
Salop. Marton Holding, Baschurch, Shrewsbury (May 28).

Somerset. West Newton Farm, West Newton, Bridgwater (May 27).
Surrey. 19, The Mount, Cranleigh (May 27); Rickwood Farm, Pound Lane, Ash Green, Ash (May 29); Robins Farm, Fisher Lane, Chiddingfold (May 31).
Sussex. Old Songhurst Farm, Loxwood, Billingshurst (May 29).
Worcs. 40, Oak Street, Netherton, Dudley (May 27).
Yorks. Church Gardens, Bentley, Doncaster (May 27); 159, Long Lane, Dore, Sheffield (May 30).

THE HAMPSHIRE CATTLE BREEDERS' SOCIETY

The Committee of Management are very pleased to report that the erection of the new A.I. Centre commenced at the end of October, 1956. The completion date was originally set for the end of September of this year, and despite the inevitable delays that have occurred through petrol rationing, it is expected that the contractors will finish during October.

The number of first inseminations carried out for the year ending December 31st, 1956, was 55,062 at an over-all conception rate of 66.5 per cent. Of these 7,399 were with deep freeze and 47,663 with fresh semen at conception rates of 55.5 per cent. and 68.2 per cent. respectively. This compares with the conception rate of 64.5 per cent. obtained in the previous year. Great credit is due to Mr. D. H. L. Madden, M.R.C.V.S., and the staff working under his supervision for this improvement.

There was some alteration in breed demand. Compared with the over-all increase in first inseminations of 15 per cent., the Aberdeen Angus increase was 38 per cent., Ayrshire 25 per cent., Friesian 25 per cent., Guernsey 9 per cent., Hereford 6 per cent., Shorthorn 4 per cent., and the Jersey breed lost ground a little. 672 first inseminations were performed using semen (deep frozen) imported from other A.I. Centres. The Red Poll semen obtained a conception rate of 61 per cent., all other breeds averaging 53 per cent. The latter included nominated services to Shorthorn, Guernsey, Friesian, and Jersey bulls. Thirty-three first inseminations with Dutch Friesian bulls were given but demand for these bulls ceased before the end of the year.

The bull stud was considerably strengthened during the year by the addition of new bulls and by the withdrawal of those bulls whose progeny had not come up to expectations. The decision to withdraw a bull because his progeny do not reach a desired standard is made only after careful examination of all available progeny records and after inspection of the daughters themselves. In this connexion it has been disappointing to find so many herds where the sires of the cows are not known. Now that all herds are tuberculin tested and ear marked, this difficulty need no longer arise.

The Society has operated an experimental pig artificial insemination service since October, 1955. Over-all progress has been disappointing but individual members have had satisfactory results. In one herd five gilts and sows have conceived to the first insemination, all farrowing with good litters. The highest monthly conception rate achieved so far based on farrowings to the first insemination has been 38 per cent.

A considerable amount of investigational work has been carried out by the Society's Veterinary Surgeon, Mr. D. H. L. Madden, and the technical staff, and a marked improvement in conception rate appears to have been effected as a result of a change of technique introduced last December. There has been close co-operation with other Centres carrying out similar experiments and with workers overseas.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Slaughter-houses

Sir,—Dr. Maurice W. Hale of the Georgia Coastal Plain Experimental Station writes in your last issue to draw attention to some unhygienic practices in European abattoirs, as shown in Mr. Olivant's excellent paper on European Meat Inspection. The photographs in your March 23rd issue not only show smoking going on in the abattoir (for which men have been dismissed before now in some British abattoirs), but one butcher is standing right in the offal tray!

What is as important as hygiene is some elementary feeling of humanity towards the animals being deprived of their lives. The pole-axe and strong-arm methods are still used in some European abattoirs in this atomic age, and even the U.S.A., with its advanced technicological skill has no humane slaughter laws. Some factories in America do use humane slaughter methods, such as the captive-bolt pistol, electricity, and CO_2. Although the latter method is an American invention, there are still large meat plants where no slaughtering progress has been made since Upton Sinclair wrote *The Jungle* about half a century ago.

Yours faithfully,

DAVID J. ANTHONY.

Veterinary Department,
Brierley Hill,
Staffs.

May 27th, 1957.

ADVERTISERS' ANNOUNCEMENTS

ALLEN & HANBURYS, LTD., announce the introduction of Swine Erysipelas Vaccine, Freeze-Dried (Living) for the active immunisation of healthy pigs against swine erysipelas. This product is manufactured by N. V. Philips-Roxane.

The vaccine is issued as a freeze-dried product together with a vial of diluent. When made up ready for use, a dose of 1 c.c. is sufficient for pigs of all sizes.

DEOSAN LTD. announce the introduction of Deosan Dairy Quat, a combined detergent steriliser in powder form specifically designed for the cleaning and sterilising of dairy utensils and equipment and approved by the Ministry of Agriculture, Fisheries and Food for use under Section 26 of the Milk and Dairies Regulations 1949.

Deosan Dairy Quat contains the purest forms of quaternary ammonium compounds available and is entirely free of the harmful impurities commonly associated with them. The compounds are made to pharmaceutical standards which this firm has been instrumental in raising.